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THE SURVEYS AND MAPPING BRANCH

*Department of Energy,
Mines and Resources*

TAKING THE MEASURE OF CANADA

SURVEYS *and* MAPPING

TAKING THE MEASURE OF CANADA, from the United States border to the northernmost tip of the Queen Elizabeth Islands, and from Mount St. Elias to Newfoundland's surf-beaten shores, is the job of the Surveys and Mapping Branch. The measure is taken in many different ways, and it is published in many different forms.

Among the methods are airborne electronic distance-measurement devices, plane- or helicopter-supported surveys, precise levelling work along highways, rivers, and railroads, stereoscopic plotting from air photographs, boundary and survey maintenance, electronic data-processing, and the old-fashioned but always adventure-some bush travel with pack horse and canoe. Among the many publications are topographical maps, aeronautical charts, cadastral plans, maps of national parks and others emphasizing special features such as boundaries, geodetic networks—and a series of tables giving the position and elevation of geodetic control points.

Many skills and professions represented

It is obvious that such a wide range of activities demands a corresponding range of skills. The mainstay of the Surveys and Mapping Branch is the surveyor, a man either with a university degree in mathematics, physics, or engineering, or a land surveyor's certificate, or both. He is supported by experts in administration, mathematics, programming, electronics, and cartography as well as a growing corps of specialists in instrument design and modification—no modern survey and mapping organization can truly stand on its own feet that does not undertake research in instrumentation and techniques. This applies with particular force to Canada, with its extremes of temperature and its vast and often trackless terrain, much of it beyond the Arctic Circle.

Seven-league boots

The basic requirement for accurate surveys and maps is a geodetic network, or series of marked points, the angles



1. Autumn foliage and intricate pattern of steel bridge frame surveyor and his instrument.

2. Operating tellurometer, and electronic distance-measurement device used extensively by the Surveys and Mapping Branch.





3. Geodetic survey tower has outer and inner framework. The outer frame bears round platform for personnel, the inner frame supports survey instruments free from disturbance.



4. Survey party



5. Precise-level
heat and



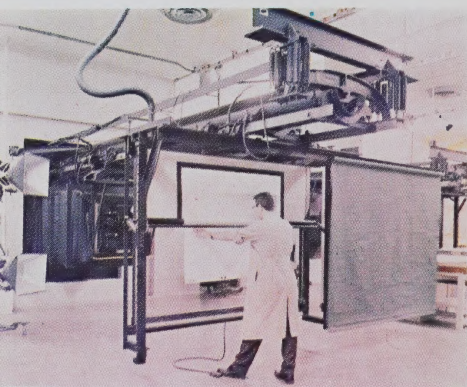
uses snowmobile for transportation between stations in the Arctic.



*ing party in northern Alberta. Plywood shield protects instrument from
e of sunlight.*

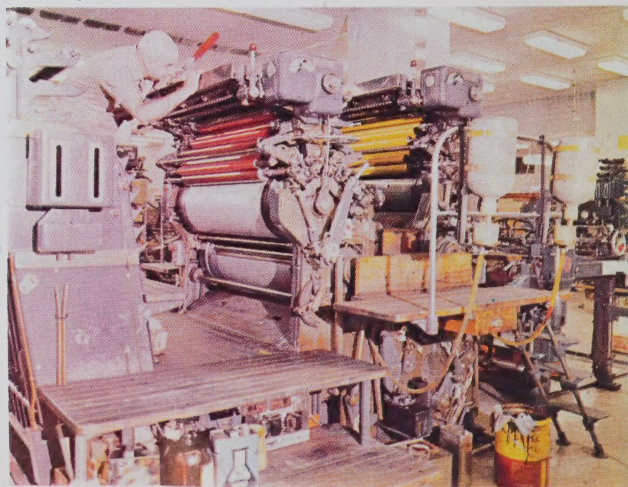


6. Freshly cleared vista on Canada U.S. boundary streaks through British Columbia forest.



7. Giant photographic camera reproduces large map - sheets with great precision.

8. Two-color lithographic printing press in Surveys and Mapping building, Ottawa.



and distances between which have been determined with great exactitude. These points, which formerly were fixed solely by angular measurements between intervisible stations of a network, can now be more rapidly determined by including electronic distance measurements, which are accurate to several inches in 30 to 40 miles. The most recent use of measurements by airborne electronic instruments has increased the range to 160 miles without loss of first-order accuracy. These new methods have speeded up geodetic surveys beyond anything the past generation of surveyors ever dreamed of, and have truly given the modern geodesist seven-league boots.

The bird's-eye view

Equally characteristic of modern map-making is the almost overwhelming reliance on air photography. So general has its use become that no area is now being mapped that has not been completely covered by vertical aerial photography. Map manuscripts showing such information as elevation, vegetation, and man-made features are then plotted directly from air photographs, with field surveys serving as control and complementation.

All this has made surveyors considerably optimistic about their surveying and mapping goals—to complete the mapping of Canada at a scale of four miles to the inch by 1967, to provide more detailed maps of areas of economic importance, and eventually to have a geodetic network whose control points are no farther apart than 20 miles.

Of planes and boundaries

Many of the surveys and maps produced by the Surveys and Mapping Branch are of a type that is also produced—though in smaller numbers and for smaller areas—by provincial, municipal, and private agencies. In one field, however, the branch enjoys a monopoly in Canada, and that is the production of aeronautical charts. These charts, which are used by pilots of civilian and military aircraft, show airports and airways, and all the radio and other aids essential for air navigation. Another federal government preserve is the maintenance of the Canada-United States boundary, in collaboration with the appropriate agency of the United States. The Surveys and Mapping Branch works with provincial governments in surveying and maintaining boundaries between provinces and territories, and helps to define and map federal electoral districts. It also carries out legal surveys on crown land. In addition it is responsible for surveys of properties in Indian reserves, national parks and the Territories.

Twelve million maps

All these efforts would be of little use if they could not be funnelled into a technical organization able to digest and coordinate them and to place them before the public speedily, accurately, and in a pleasing and understandable form. This task is handled by an elaborate and highly specialized drafting and printing establishment, in which a map undergoes a confusing variety of metamorphoses until it emerges, crisp and colorful, from one of the large offset presses. Topographical maps are drafted to many scales, those of 1:250,000 and 1:50,000 being the most common. The Branch prints more than 4,000 different maps each year, and its total stock approximates twelve million, of which about one million are sold and distributed annually. The Branch also maintains the National Air Photo Library, which has a stock of more than three million air photos of Canada and supplies the needs of map-makers, surveyors, construction and mining companies, provincial and municipal governments, and a host of other customers.

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